Mains transformer 190 V... 390 V

9803 720 81002

FILING INSTRUCTIONS

File this documentation in binder:

UNIT manual MEDIO 50/65 CP-H
UNIT manual SUPER CP

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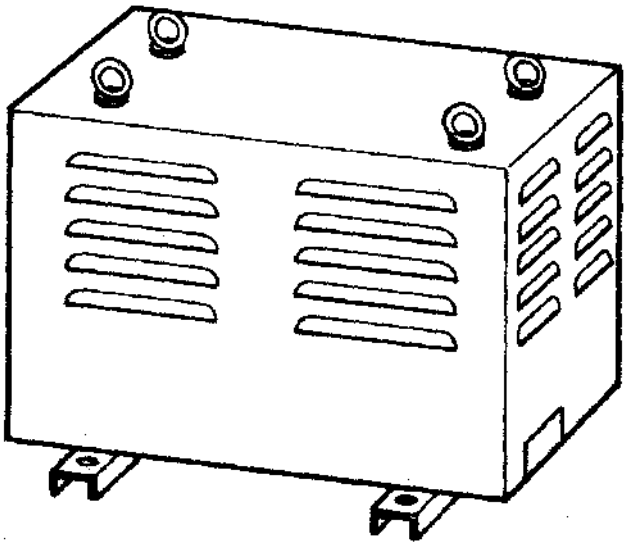
SERVICE MANUAL
742
UNIT

Mains transformer 190V...390V

9803 720 81002

Techn. No. 4512 103 76651



Transformer permitting the MEDIO 30/50 CP or the SUPER 50 CP
to be operated on 190V...390V three-phase supplies.

DMC Hamburg

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SERVICE MANUAL - UNIT

Mains transformer 190V...390V

Author: P. Thron

Type No: 9848 500 03902
Techn. No: 4512 103 76651

In case there are any questions concerning this manual,
please send this LOPAD via fax to 49/(0)40/5078 2481

File: Mains Transformer 190V 390V b960

List of pages and drawings (LOPAD)

Manual Order No: 4512 103 40463
released: 03/2003

0.5		223 mm	(Rosa Karton)
1			
2			
3...11	(86.0)		
Z-1	(86.0)	A4	
Z-2	(86.1)	A4	
Z-3	(86.0)	A4	
Z-4	(86.0)	A4	
Z1-1.2	(e/88.2)	A1/A3	4512 103 75000
Z1-1.2	(f/90.1)	A1/A3	4512 103 75000
Z-5	(86.0)	A4	

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Power supply 190V ... 390V MEDIO 30/50 CP	Z1-1.2
Installation with SUPER 50 CP	Z1-1.2

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1. General

Both the MEDIO 30/50 CP and the SUPER 50 CP generators are exclusively intended for connection to three-phase supplies 380V. The mains transformer is used as an adaptation transformer for three-phase supplies with voltages between 190V and 390V and permits the above generators to be operated in the power class of up to 50 kW. Be sure to watch the influence of the transformer on the internal mains resistance.

2. Planning Data

2.1. Type of mains

Five-conductor three-phase mains symmetrical with respect to earth; voltage 190V to 390V; 50/60 Hz; pre-fused with 100 A slow-blow.

The star point of the transformer must not be connected with the neutral conductor.

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2.2. **Earth-leakage circuit breaker** (Fi-switch)

Depending upon local regulations it may be necessary to provide the following leakage circuit breaker additionally between safety fuse and x-ray installation:

Siemens earth–leakage circuit breaker NFJ 63/4
order No. 5SZ3 466

(rated fault current 30 mA, rated current 63A);

connecting terminals for wire cross sections of up to 25 mm^2;
safety fuse to be series-connected max. 100 A slow-blow.

2.3. Mains resistance

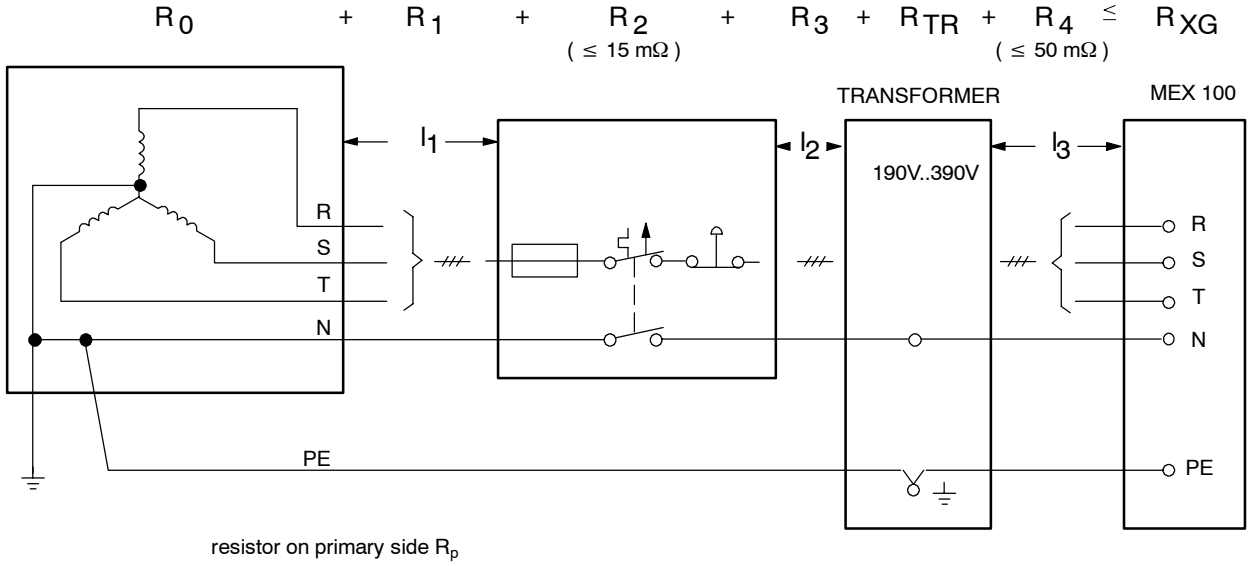
For operation **without mains transformer** the mains resistance at a mains voltage of 380V has been determined as follows (viewed from the input of the generator, measured between two phases each):

Generator output (programmable)	Medio 30 CP 100%	Medio 30 CP 80%	Medio 50 CP 100%	Medio 50 CP 80%	SUPER 50 CP 100%	SUPER 50 CP 70%
380 V	≤ 0.5 Ω	≤ 0.7 Ω	≤ 0.3 Ω	≤ 0.5 Ω	≤ 0.3 Ω	≤ 0.5 Ω

These values include the resistances of the leads $\rceil_1$ and $\rceil_3$ as

well as the resistances of the prefuse, the earth-leakage circuit breaker and the EMERGENCY-OFF circuit (see section A, GROUP MANUAL).

When working **without a mains transformer** 190 V ... 390 V the mains resistances are the same, but the internal resistances of the transformer (R_{TR}) has to be considered additionally (see sketch).



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2.4. Calculation of resistances

Starting from the max. permissible mains resistances stated under 2.3. and the above sketch we make the following statement:

$$\text{Assuming } R_4 (\lceil_3) = 50\ m\Omega$$

you will obtain the following result for 100% output of, for instance, the MEDIO 50 CP:

$$R_{xg} \leq 300\ m\Omega \rightarrow \quad R_{secondary} = R_{xg} - R_4$$
$$R_{secondary} = 300\ m\Omega - 50\ m\Omega = 250\ m\Omega$$

The value of $R_{secondary}$ is transferred to the primary side of the transformer as follows :

$$ü^2 = \frac{R_1}{R_2} \rightarrow R_1 = ü^2 \bullet R2$$

$$R_{primary} = ü^2 \bullet R_{secondary} = \frac{1}{3} \bullet 250\ m\Omega \approx 80\ m\Omega$$

(From table Z-1 : $ü^2 = \frac{1}{3}$ at 220 V mains voltage)

ü = transf. ratio

When deducting the primary-side internal resistance $R_{Tr.}$ of the transformer (from table Z-1: 20 mΩ at 220 V mains voltage) from $R_{primary}$

you obtain: $R_p = 80\ m\Omega - 20\ m\Omega = 60\ m\Omega$

R_p is composed of: $R_p = R_0 + R_1 + R_2 = R_3$

(see sketch under 2.3.).

Definitions:
- R_0 = internal mains resistance
- R_1 = length of lead $\lceil_1$
- R_2 = transition resistance of fuses, earth-leakage circuit breaker and EMERGENCY-OFF switch
- R_3 = length of lead $\lceil_2$

As regards the resistances of the leads and the cross sections to be used refer to section A of the generator GROUP MANUAL:

To simplify the calculation refer to table Z-1. Starting from the available mains voltage you can immediately read the value for the max. permissible resistance on the primary side R_p . The values of the table are based on the statement R ($\lceil_3$) = 50 mΩ . So 50 mΩ are available for the length $\lceil_3$ from the secondary side of the transformer to the wall junction. Of course, you can start the calculation from a lower or higher resistance value for the length $\lceil_3$ if local conditions require you to do so. In this case, however, the resistance on the primary side R_p has to be calculated anew.

If the total mains resistance R_0 is too high or if the required mains resistance cannot be reached for other reasons, the generator can be operated with a reduced output (see 2.3. and Z-1).

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2.5. Dimensions and weights

See drawind Z-2

2.6. Installation

Secure the transformer to the floor with the appropriate fixing material (not included in the scope of delivery). Check the loading capacity of the floor at the site of installation.

Use no single conductors for establishing the connection - observe national rules and regulations.

Cable terminals with an inside diameter for M8 screws are required for fixing the mains feeders to the terminal board of the transformer (not included in the scope of delivery).

2.7. Accessories

The accessories include a line-up terminal (NX1202), which is needed for operating the mains transformer with a MEDIO 30/50 CP generator.

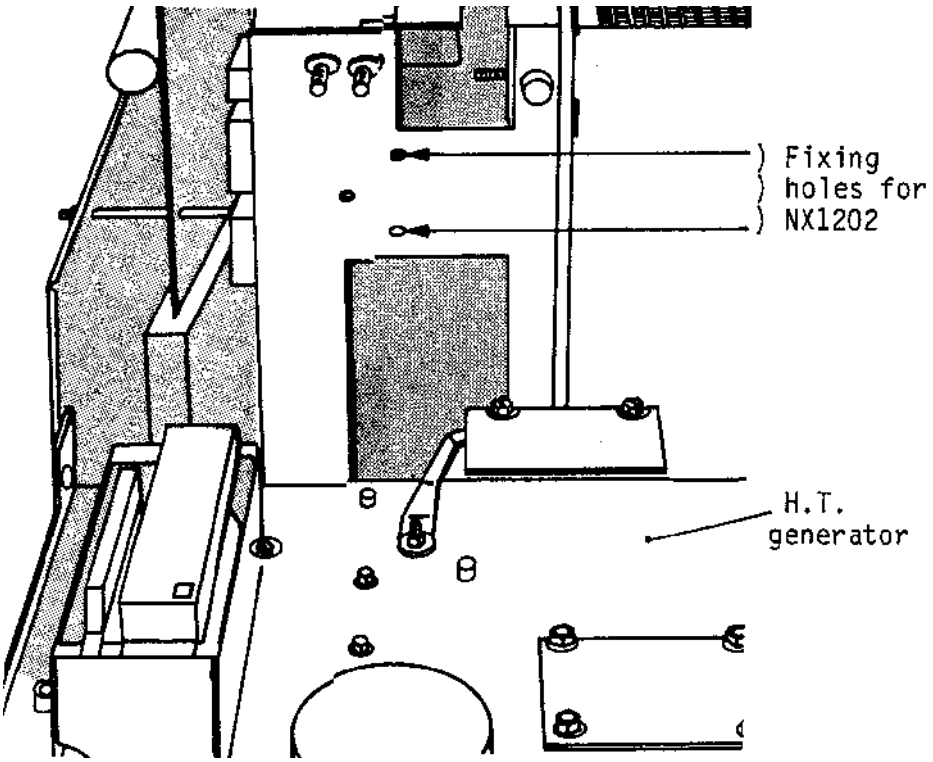
3. Installation with MEDIO 30/50 CP

Drawing Z-3 shows the winding taps and the connection terminals of the mains transformer. Primary and secondary connections should be established on the right-hand side of the connection terminals.

The star point (X, Y, Z) of the transformer must not be connected with the neutral conductor N of the mains because otherwise the series-connected fuses may react as a result of increased transient current peaks. Therefore, the N-conductor is divided into a power component which is connected with the transformer N3 (X, Y, Z) , and an interference suppression component which is connected with the earthy neutral N (see Z-4).

3.1. Modifications to be carried out

3.1.1. Fix the terminal NX1202 found among the accessories of the transformer by means of two self-cutting screws (M4 x 8) in the holes located underneath the protective earth-conductor connections (see sketch).



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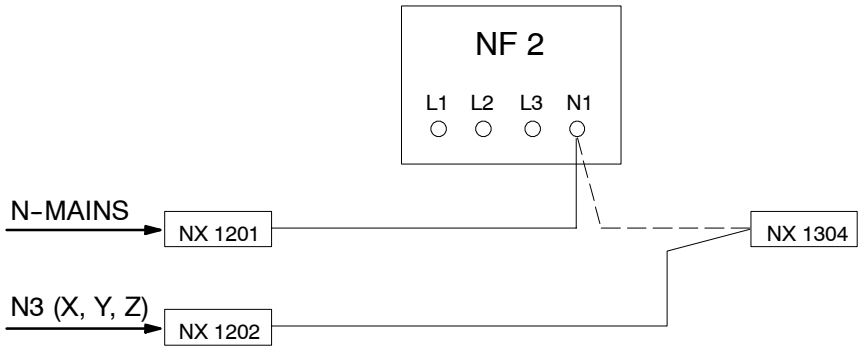
3.1.2. Cancel connection NF : N1 ////// NX1304) see
Establish connection NX1202 ——— NX1304) sketch



The overall function of transformer 190V ... 390V and generator MEDIO30/50 CP is represented in Z1-1.2.

4. Installation with SUPER 50 CP

Drawing Z-3 shows the winding taps and the connection terminals of the mains transformer. Primary and secondary connections should be established on the right-hand side of the connection terminals.

The star point (X,Y,Z) of the transformer must not be connected. The block wiring diagram Z-5 shows the connection between mains transformer 190V ... 390V and SUPER 50 CP generator.

The electrical connection is also shown in drawing Z1-2.1.1 of book 2 (Generator Basic Version) SUPER50 CP.

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VOLTAGE SPANNUNG TENSION			$R_{TR.}$		MEDIO 30 R_P		MEDIO 50 R_P		SUPER 50CP R_P	
MAINS NETZ SECTEUR (PRIMARY)	SECONDARY SEKUNDÄR SECONDAIRE	$ü^2$	PRIMARY PRIMÄR PRIMAIRE	SECONDARY SEKUNDÄR SECONDAIRE	GENERATOR OUTPUT (PROGRAMMABLE) GENERATORLEISTUNG (PROGRAMMIERBAR) PUISSANCE GENERATEUR (PROGRAMMABLE)					
					100%	80%	100%	80%	100%	70%
190V	380V	$\frac{1}{4}$	25	100	85	130	40	85	40	85
200V	380V	$\frac{1}{3,61}$	25	90	100	150	45	100	45	100
207V	380V	$\frac{1}{3,37}$	24	80	105	170	50	105	50	105
220V	380V	$\frac{1}{3}$	20	60	130	190	60	130	60	130
230V	380V	$\frac{1}{2,73}$	20	55	140	210	70	140	70	140
240V	380V	$\frac{1}{2,51}$	20	50	160	230	80	160	80	160
250V	380V	$\frac{1}{2,31}$	20	45	175	260	85	175	85	175
343V	380V	$\frac{1}{1,23}$	12	15	350	500	190	350	190	350
380V	380V	1	TRANSFORMER NOT REQUIRED TRANSFORMATOR NICHT ERFORDERLICH TRANSFORMATEUR PAS NECESSAIRE.							
390V	380V	$\frac{1}{0,95}$	10	10	460	650	250	460	250	460

ALL RESISTORS ($R_{TR.}$ R_P) IN mΩ

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RESISTOR ON PRIMARY SIDE R_P

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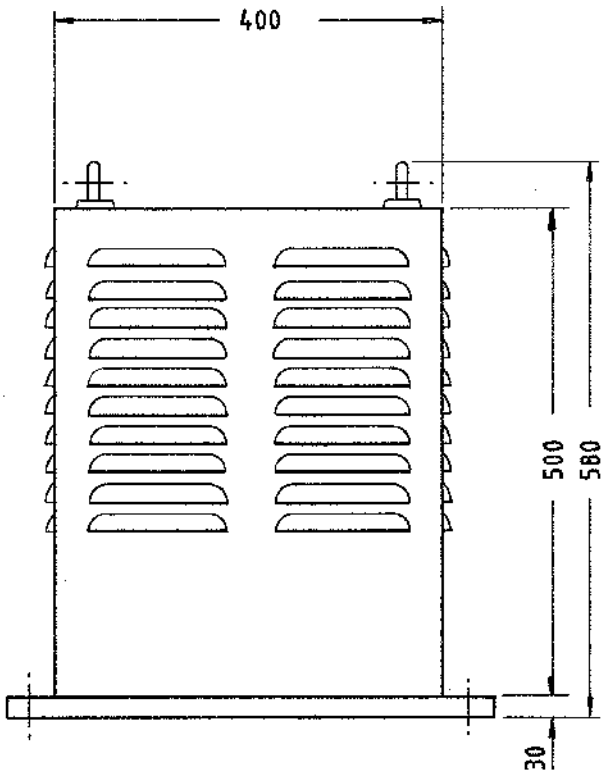

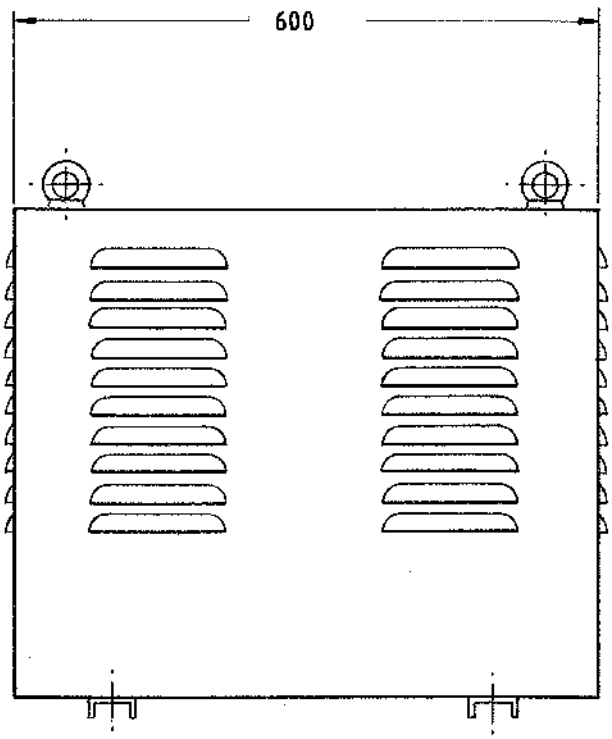

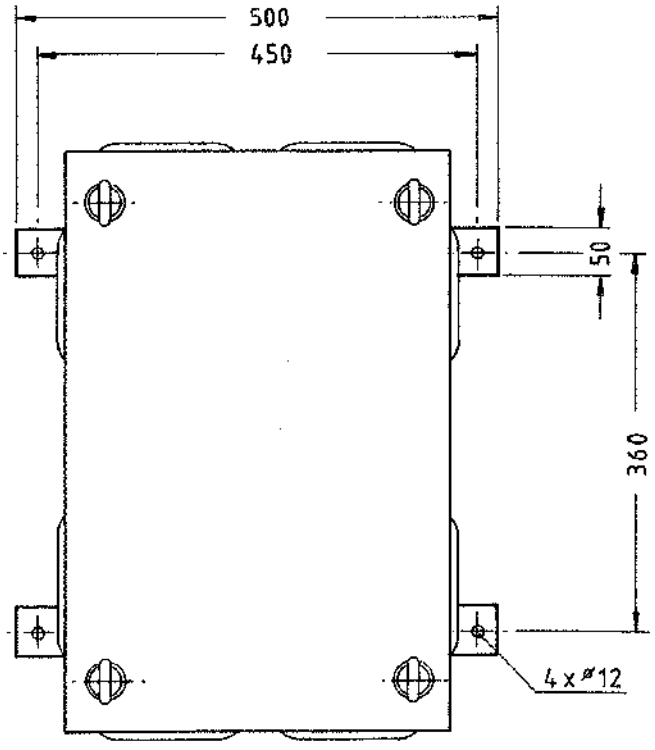

WEIGHT : 220 kg

MECHANICAL DIMENSIONS

MAINS TRANSFORMER
190V ... 390V

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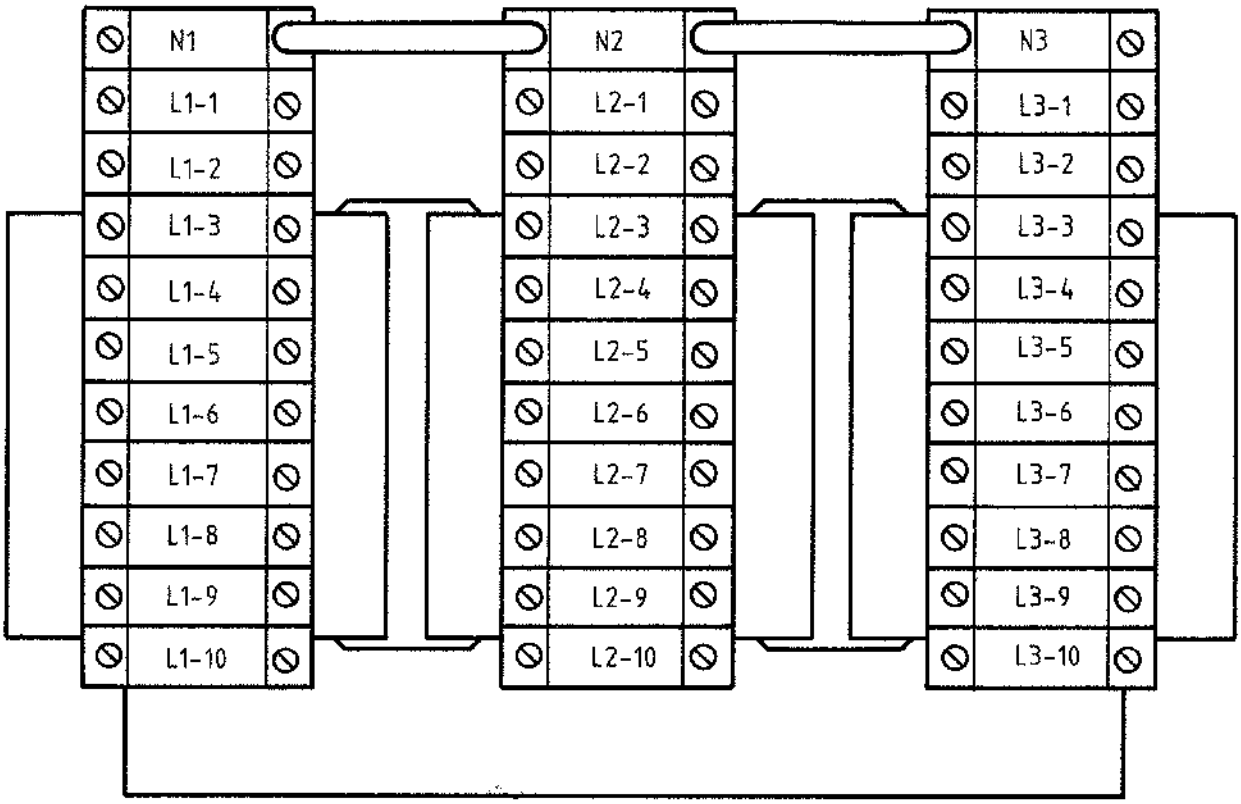

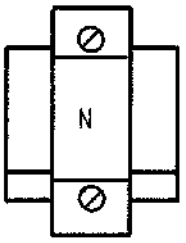

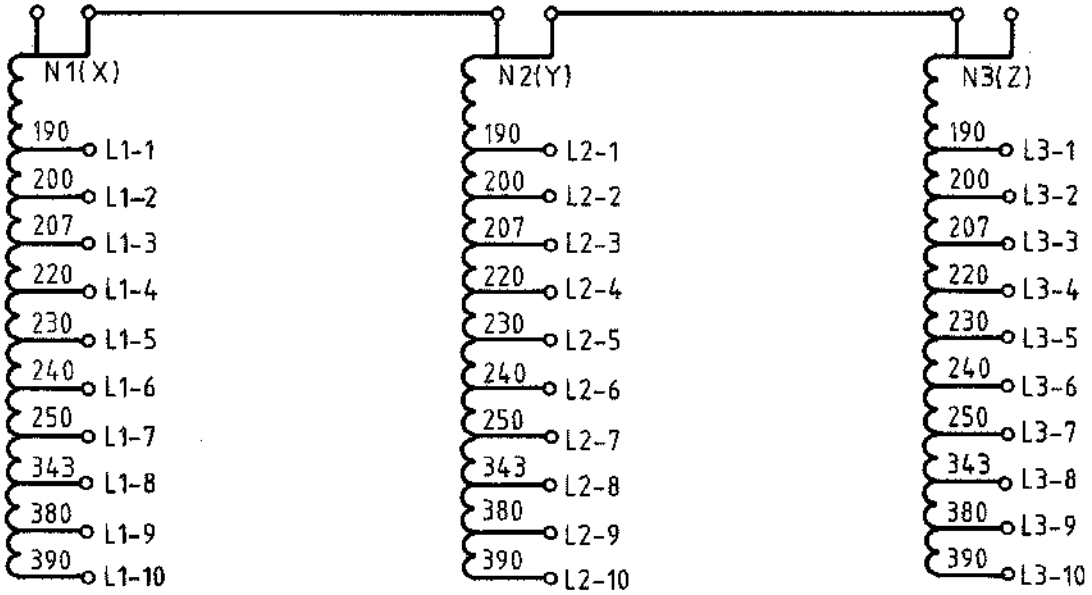

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PEI 9803 720 81002_Z3

TO AVOID BLOWING FUSES DURING SWITCH ON, THE NEUTRAL OF TRANSFORMER (XYZ) MUST NOT BE CONNECTED TO THE NEUTRAL OF MAINS.

MAINS TRANSFORMER FOR 190V ... 390V

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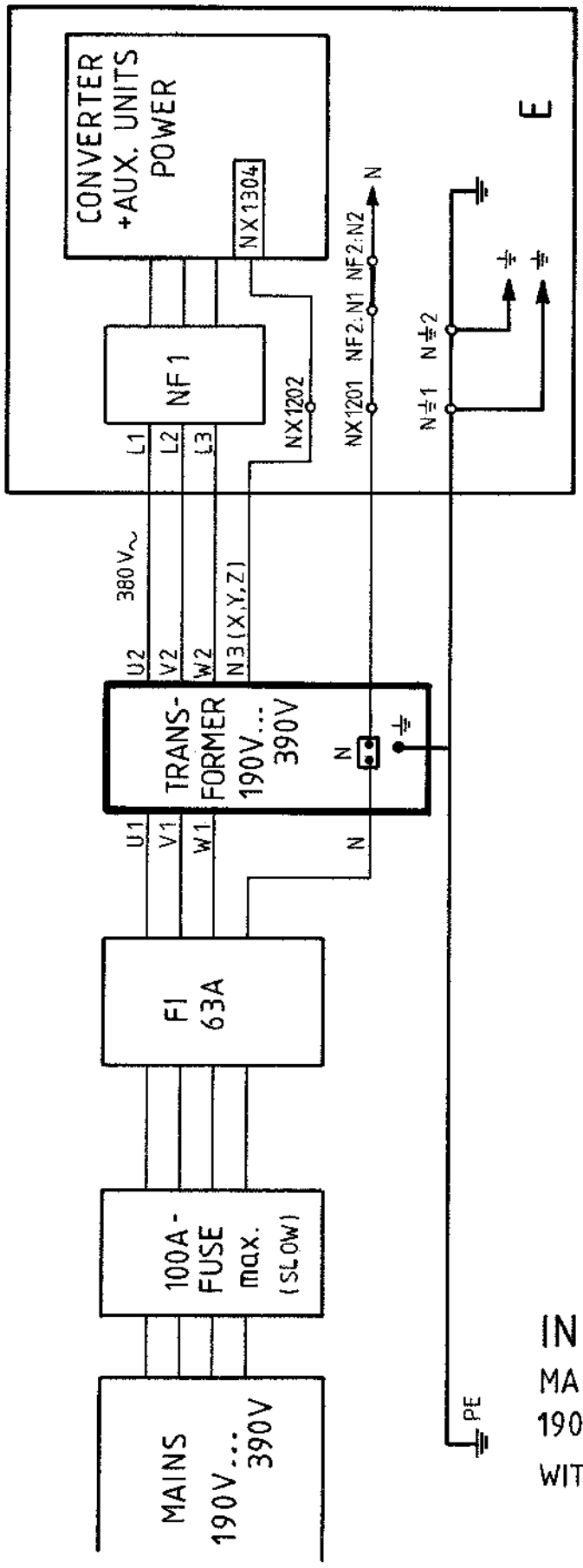

INSTALLATION
MAINS TRANSFORMER
190V...390V
WITH MEDIO 30/50CP

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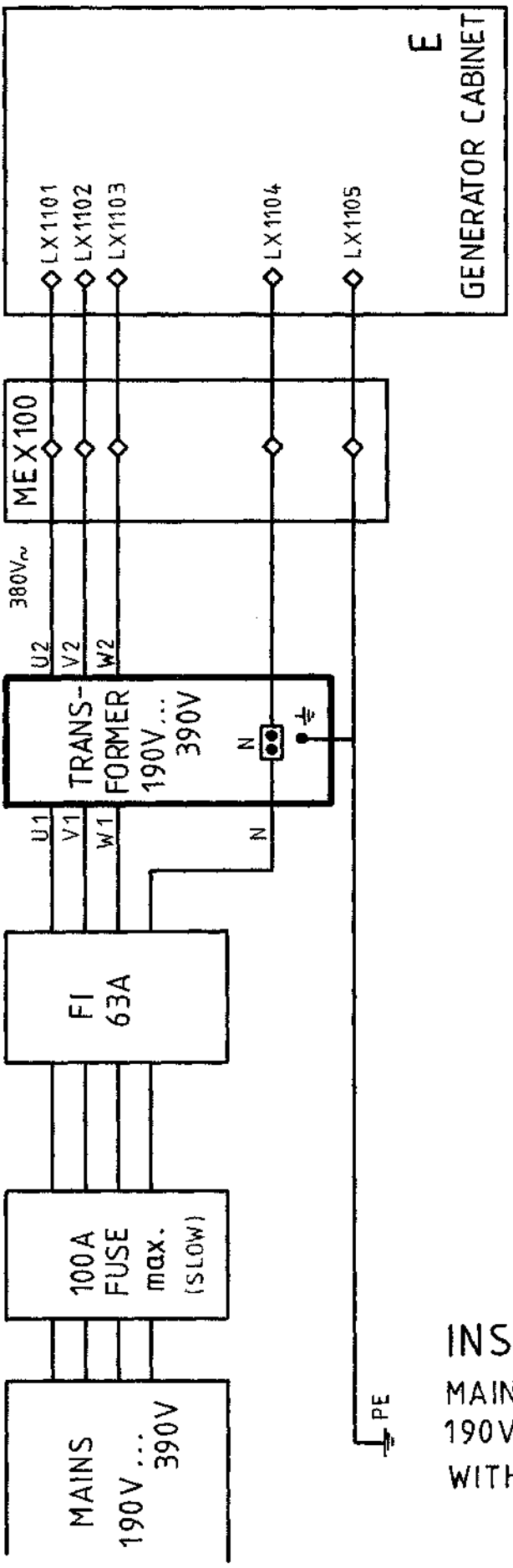

INSTALLATION

MAINS TRANSFORMER
190V...390V
WITH SUPER 50CP

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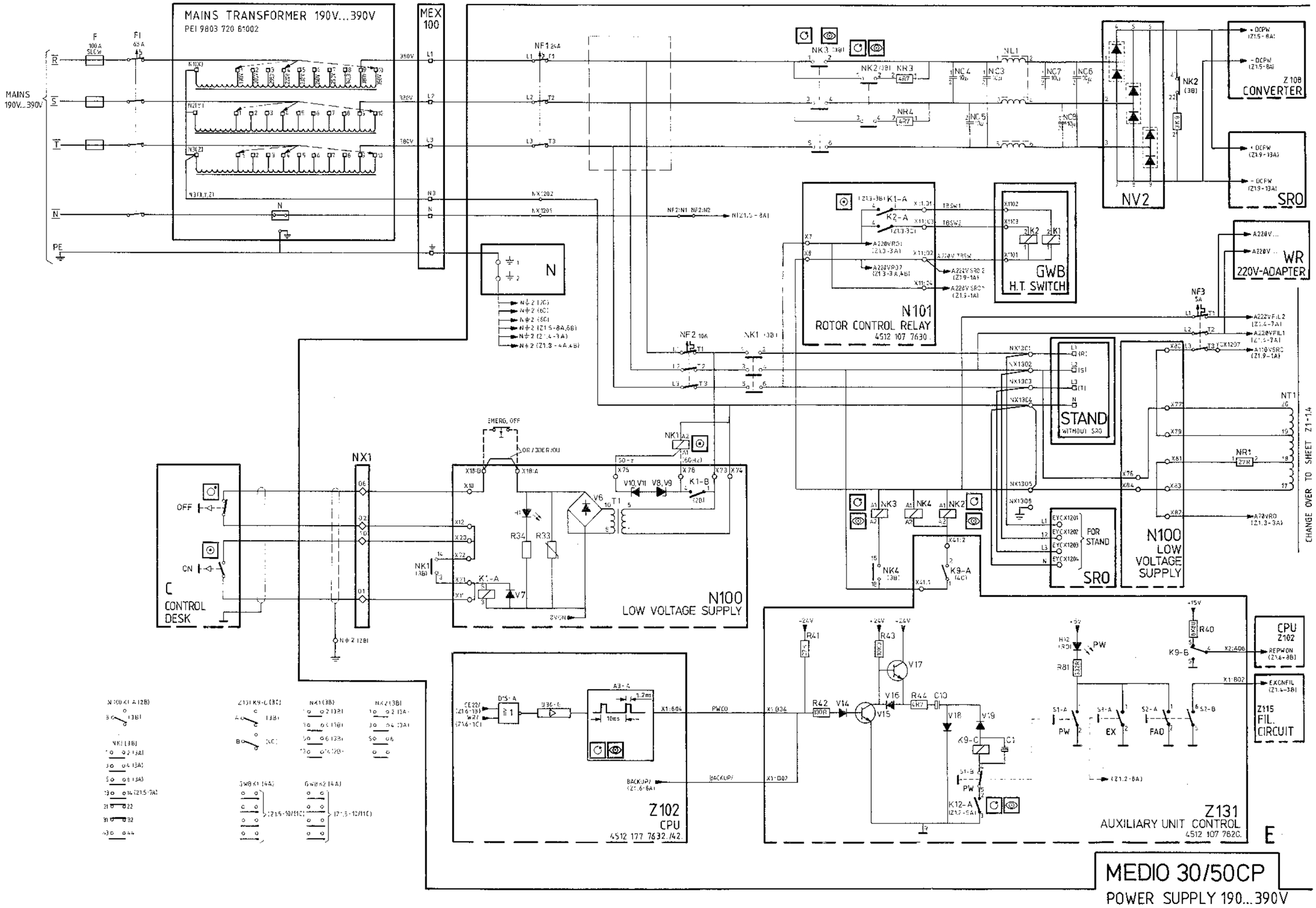

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Z1-1.2

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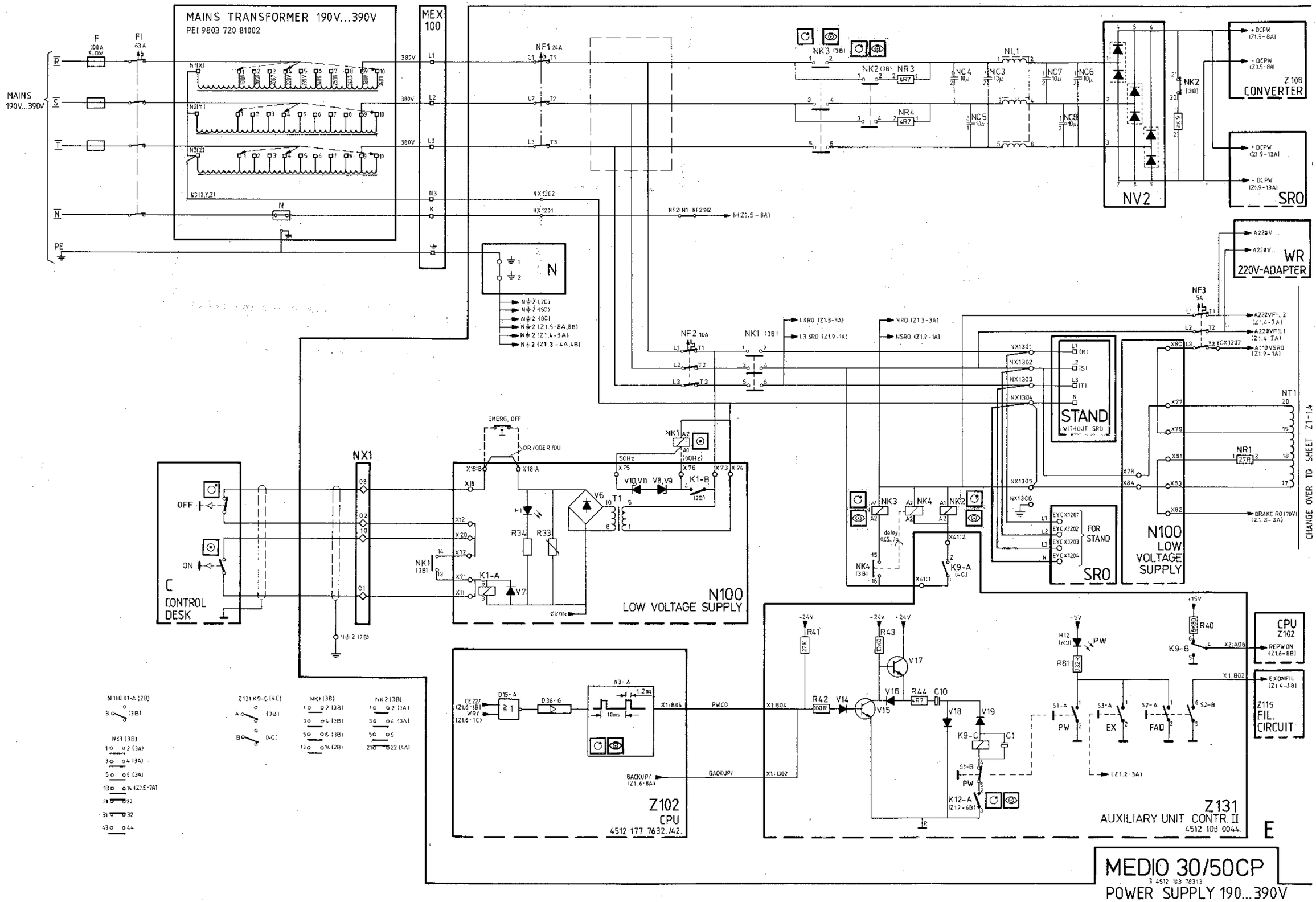

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